

# Reverse Mixed-Ownership Reform and Ambidextrous Innovation Investment in Private Enterprises: Evidence from China

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## Abstract

Amid the country's vigorous promotion of mixed-ownership reform, optimizing the layout of state-owned capital and guiding private enterprises in innovation are crucial for achieving high-quality economic development. This study, adopting the perspective of "reverse mixed-ownership reform," which involves the introduction of state-owned capital into private enterprises, analyzes the impact of state-owned equity and its shareholding level on the ambidextrous innovation investment of private enterprises using A-share private listed companies from 2007 to 2021 as samples. The findings reveal that the introduction of state-owned capital significantly enhances the ambidextrous innovation investment of private enterprises. Furthermore, there is an inverted U-shaped relationship between the level of state-owned equity shareholding and developmental innovation investment, while a linear positive correlation exists with exploratory innovation investment. Additionally, financing constraints play a mediating role in the relationship between state-owned equity participation and innovation investment, while agency costs negatively moderate the relationship between the introduction of state-owned capital and ambidextrous innovation investment. Private enterprises undergoing direct privatization exhibit stronger organizational inertia, exhibiting a positive impact on both types of innovation investment. This study provides theoretical support for further advancing mixed-ownership reform and rationalizing the layout of state-owned capital, while also offering empirical evidence for promoting high-quality development among private enterprises.

**Keywords:** reverse mixed-ownership reform, ambidexterity innovation investment, private-owned enterprises governance

## 1 Introduction

The 20th National Congress of the Communist Party of China pointed out the need to deepen the reform of state-owned capital, accelerate the optimization of the layout and structural adjustment of state-owned economy, and promote the reasonable flow of state-owned capital. Under the requirements of the "hierarchical classification" reform, the mixed-ownership reform has entered a deep water zone. The fundamental issue lies in the implementation of "capital management", concentrating resources on key industries, critical areas, and advantageous enterprises, implementing the strategy of innovation-driven development, and accelerating the cultivation of strategic emerging industries, so that state-owned capital can develop towards "market rationality". In recent years, a large number of innovative enterprises with international cutting-edge and advanced technologies have emerged in private enterprises, contributing more than 70% of technological innovation achievements. However, according to the "Research and Analysis Report on China's Top 500 Private Enterprises in 2021" released by the Economic Department of the All-China Federation of Industry and Commerce, 87.36% of key technologies in China's top 500 private enterprises come from self-development and research. In contrast to the background of the society's R&D investment intensity reaching a new high of 2.44%, only 38.27% of the top 500 private enterprises have an R&D investment intensity exceeding 1%. As an important strategy and path to unleash innovation vitality, mixed-ownership reform will organically combine state-owned enterprises with private enterprises, and through mutual visits, integrate the advantages of private enterprises in market mechanisms, efficiency effects, and technological innovation with the capital, resources, technology, and management advantages of state-owned enterprises to achieve value enhancement for both sides. The "Opinions of the State Council on Developing Mixed-Ownership Economy in State-Owned Enterprises" explicitly states

that "encouraging state-owned capital to invest in non-state-owned enterprises in various ways" and "fully utilizing the capital operation platform of state-owned capital investment and operation companies". The "Opinions" provide clear policy support for reverse mixed-ownership reform in private enterprises, that is, introducing state-owned capital into private enterprises for mixed-ownership reform. This reform model has gained support from many state-owned and private enterprises in the context of economic uncertainty. Therefore, exploring the impact of reverse mixed-ownership reform policy on the "market rationality" of state-owned capital from a micro perspective has significant practical significance. Does state-owned capital's participation in private enterprises lead to immediate and significant changes in private enterprises? Does it affect private enterprise innovation investment? Can it improve state-owned capital's "market rationality"? What is the mechanism by which this reform model promotes private enterprise innovation investment? The study of these issues is of great significance for innovative mixed-ownership reform theory and practice.

Against this background, scholars have conducted relevant research on the implementation of mixed ownership reform at the micro level of enterprises. Existing studies mostly focus on the impact of private enterprises' participation in mixed ownership reform of state-owned enterprises on the development of both private and state-owned enterprises. Regarding the form of mixed ownership reform where state-owned enterprises introduce non-state capital, some scholars have found that this effectively improves the corporate governance level of state-owned enterprises and has a positive impact on their performance (H. Li & Shao, 2019; Shen & Yang, 2019). From the perspectives of equity structure and top-level governance, mixed ownership reform has a significant positive impact on the innovation of state-owned enterprises by alleviating agency problems and weakening tunneling effects of major shareholders (Xiang & Yu, 2020). In terms of the impact on the development of private enterprises themselves, Li et al. believe that private enterprises can improve their economic and political status and fulfill their social responsibilities by raising funds through state-owned enterprise equity (B. Li, Xu, McIver, Liu, & Pan, 2022). However, there is still a lack of sufficient attention paid to the form of mixed ownership reform where state-owned equity participates in private enterprises. Theoretically, some studies suggest that state-owned capital and private enterprises can complement each other through capital cooperation, which can help state-owned capital maintain and increase its value, and have a positive impact on improving the governance structure and performance of private enterprises (Q. Wu, Li, & Yang, 2023); while some scholars argue that state-owned equity participation in private or foreign-controlled enterprises may lead to uncontrollable business and financial risks, which can easily result in the loss of state-owned assets (W. Chen, 2017). Existing empirical studies have examined the positive economic consequences that state-owned capital entering private enterprises can bring from the perspectives of operating performance (H. Yu, Yang, & Song, 2017), resource supply and financing (Song, Feng, & Tan, 2014), and investment efficiency (Z. Li, Yun, Huang, & Lian, 2021). However, from the perspective of corporate innovation, it has been found that state-owned capital has a positive effect only on innovation in non-state-owned family businesses (Luo & Qin, 2019), which is not enough to draw a conclusion that the impact of introducing state-owned capital on private enterprise innovation is positive or negative. This article believes that the above-mentioned research has not paid attention to the differences between state-owned enterprises and private enterprises in terms of the stock and willingness to invest in innovation resources, nor has it taken into account the influence of ownership background differences. It has also failed to distinguish between innovative activities with conflicting contradictions based on resource investment. According to the complexity of innovative activities, innovative activities can be divided into exploratory innovation and developmental innovation, namely ambidexterity innovation (Ribau, Moreira, & Raposo, 2019). The former focuses on fundamental and substantial innovative activities, constantly expanding enterprise boundaries through the development of new products and services; while the latter focuses on optimizing and minor innovative activities, improving existing products and services to adapt to changes in market demand. Innovation is inevitably a necessary choice for enterprises to seek competitive advantages. In the era of economic transformation where "what defeats you is not your competitors," a single innovation model is not advisable (J. Chen, Qu, & Wang, 2019). On the basis of continuous innovation, seeking disruptive innovation is the only way for sustainable operation.

Based on this, this article selects private listed companies as research samples to explore the impact of state-owned capital participating in private enterprises in a reverse mixed-ownership reform form on the ambidexterity innovation investment of private enterprises. A theoretical analysis logic is proposed, including whether state-owned capital participation affects private enterprises, why it affects, and how it affects ambidexterity innovation investment of private enterprises. The impact of state-owned capital participation on ambidexterity innovation investment is tested, and the theoretical analysis is validated through the intermediate effect of financing constraints, the scenario adjustment effect of agency costs, and the heterogeneity test of privatization methods. The contribution of this article mainly lies in three aspects: (1) Compared with the

existing research on reverse mixed-ownership reform, which mainly focuses on the impact of listed companies on innovation, this article lacks comparative research on the impact of reverse mixed-ownership reform on different types of ambidexterity innovation. This article takes the change in the equity nature structure of private enterprises as the starting point and divides innovation investment into exploratory innovation investment and development innovation investment which expands the research on the economic consequences of mixed-ownership reform governance. (2) Compared with existing literature, this article mainly focuses on the ambidexterity innovation investment perspective, solving the "neck-blocking" technical problem from the source of innovation, and ambidexterity innovation investment is a prerequisite condition, analyzing and solving problems from the source of innovation. (3) Provide new evidence for examining the economic consequences of state-owned capital. By examining the impact of state-owned capital participation on private enterprise innovation, it is beneficial to further deepen the direction of optimizing layout towards "market rationality" for state-owned capital.

## 2 Theoretical Hypothesis

### 2.1 State-Owned Equity and Ambidexterity Innovation of Private Enterprises

From the perspective of resource allocation and based on the theory of resource dependence, enterprises tend to cultivate favorable relationships with resource suppliers in uncertain environments. Especially in the context of China's incompletely developed capital market, the government, as the leading allocator of scarce resources, leverages its advantage of concentrating forces to accomplish significant tasks during macroeconomic regulations. The naturally sustained good relationship between state-owned enterprises (SOEs) and the government directly or indirectly affects ambidextrous innovation investments. During the resource allocation process, there is a subjective bias towards SOEs, while private enterprises (PEs) have long been disadvantaged in this process.

Ambidextrous innovation, as a high-risk activity characterized by long duration, high investment costs, and uncertain outcomes, faces more severe financing constraints for PEs with high degrees of information asymmetry compared to SOEs under the current institutional context of China. This poses a significant obstacle to PEs' ambidextrous innovation efforts. The injection of state capital into PEs, creating a symbiotic relationship between the government and enterprises, not only facilitates PEs' access to direct financial subsidies, tax reductions, and other policy preferences, alleviating financing difficulties and costs for PEs. This resource effect increases the total amount of resources available for ambidextrous innovation. Additionally, through the governance effect of equity checks and balances, it reduces the sensitivity of PEs' economic performance, steering investment towards ambidextrous innovation projects with longer overall return cycles. In essence, this approach increases PEs' ambidextrous innovation investment from the perspective of resource allocation.

In recent years, to promote the deep integration of state-owned equity and PEs, PEs introducing state capital have not only received more direct government subsidies, supplementing the total resources available for ambidextrous innovation. They have also supported the development of ambidextrous innovation industries by establishing research and development platforms for ambidextrous innovation technologies. Simultaneously, this has encouraged PEs to actively fulfill their social responsibilities. Through participating in reverse mixed-ownership reforms, PEs have become the beneficiaries of preferential tax policies, including deferred tax incentives for non-monetary asset investments and technology-based equity participation. Smooth communication with government departments has increased the likelihood of recognition and approval, effectively reducing the tax burden on PEs' ambidextrous innovation projects and stimulating their willingness to engage in ambidextrous innovation. Based on this analysis, Hypothesis H1a is proposed.

Hypothesis 1a: The participation of state-owned capital significantly enhances the ambidextrous innovation investment of private enterprises.

However, from the perspective of efficiency and based on the theory of dynamic capabilities, private enterprises possess the ability to adapt to environmental changes and seize ambidextrous innovation opportunities. By cultivating and enhancing their dynamic capabilities, namely flexible management mechanisms, efficient decision-making mechanisms, and comprehensive incentive mechanisms, private enterprises can rapidly identify market opportunities and carry out rapid ambidextrous innovation to gain first-mover advantages and respond to rapid market changes.

In contrast, the participation of state-owned equity in private enterprises may introduce elements that reduce the dynamic capabilities of private enterprises. Firstly, the introduction of state-owned equity may lead to excessive government intervention and administrative constraints on private enterprises. Excessive administrative intervention may also lead to ambidextrous innovation decisions deviating from market orientation, which is not

conducive to the ambidextrous innovation investment of private enterprises. The exercise of state-owned equity often carries non-economic goals, and pursuing economic benefits is not the primary value goal of the company, which limits the enthusiasm of enterprises to pursue ambidextrous innovation to a certain extent and loses the original ambidextrous innovation motivation. Secondly, the participation of state-owned equity may introduce rigid and inefficient organizational management elements from traditional state-owned enterprises into private enterprises. In the structure of state-owned equity, the existence of multiple agency relationships increases agency costs. State-owned equity often has a certain degree of closure and lacks sufficient market competition pressure, which may lead to a lack of sufficient motivation and pressure for state-owned enterprises in ambidextrous innovation, making it difficult to form an effective ambidextrous innovation mechanism and culture, and further reducing the investment of private enterprises in ambidextrous innovation. Finally, state-owned equity may lead to the complication and prolongation of ambidextrous innovation decision-making. Due to the long decision-making chain involving multiple levels and departments, decision-making efficiency may be low, unable to respond to market changes and seize ambidextrous innovation opportunities in time, thus missing ambidextrous innovation opportunities. The complex accountability mechanism may also lead to more concerns and constraints faced by state-owned enterprises in ambidextrous innovation decision-making, affecting the enthusiasm for ambidextrous innovation. Based on this analysis, Hypothesis H1b is proposed.

Hypothesis 1b: The participation of state-owned capital significantly reduces the ambidextrous innovation investment of private enterprises.

### *2.2 The Level of State-Owned Equity Holdings and Ambidexterity Innovation Investment of Private Enterprises*

Based on the theoretical analysis above, it can be concluded that injecting state-owned capital into private enterprises can play a significant positive role in promoting ambidexterity innovation investment by utilizing the resource effects brought by ownership background, alleviating financing constraints, increasing the total supply of resources, and adjusting the direction of resource allocation for innovative investment. However, the impact of state-owned equity injection into private enterprises on ambidexterity innovation investment is not a simple linear relationship. The purpose of mixed ownership reform is not simply privatization or nationalization, but to achieve a win-win situation between state-owned capital and private economy while preserving the interests of state-owned capital and small and medium shareholders (L. Ma, Wang, & Zhang, 2015). The path of mixed reform of state-owned equity going "in" or "out" is still being explored in practice. Based on existing research, the equity structure is an important factor affecting the corporate governance level of enterprises including private ones. Diversified equity can balance each other and promote the improvement of corporate governance level and operational performance (X. Ma, Tang, & Zheng, 2021). By analogy, does the optimal equity structure exist to form an optimal balance mechanism that has a positive impact on ambidexterity innovation investment in private enterprises?

According to modern property rights theory, achieving a high degree of complementarity between resiambidextrous claims and resiambidextrous control is the essence of achieving optimal ownership arrangements (S. Wang, Feng, & Xu, 2019). The attribution of resiambidextrous control and resiambidextrous claim rights of ambidextrous innovation gains will directly affect the ambidextrous innovation willingness and ambidextrous innovation investment, and the equity structure is the key to delineate the size of the ratio between the two. However, the consideration of the impact of changes in ownership structure on the choice of innovation type cannot be separated from the consideration of innovation motivation behind it. On the one hand, in the face of a complex and changing market development environment, innovation forms a competitive advantage that helps companies win a place in the rapidly changing market. On the other hand, as a major development strategy driven by the country, a series of innovation incentive policies have been introduced, and the continuous and deep release of policy dividends has stimulated corporate innovation and development vitality. Specifically, when the proportion of state-owned capital is relatively low, participating state-owned equity does not change the independent and autonomous innovation management of private enterprises. Under the influence of innovative motivation of market competition mechanism, one of the demands for innovation and development of private enterprises is to achieve the goal of economic performance growth in a short period of time through low-cost, high-yield, and relatively low-risk development-oriented innovation investment (Grossman, 1986). By implementing differentiated, low-cost, and specialized strategies to effectively segment the market, increase consumer satisfaction with existing products, and expand existing product competitive advantages. At the same time, the idea of state-owned equity as an agent investor participating in private enterprises is consistent with this. Only by retaining state-owned capital without loss can capital appreciation be achieved. Based on the incentive effect of resource synergy, at this time, participating state-owned equity plays a role in promoting ambidexterity innovation investment in private enterprises based on objective characteristics such as institutional resource

aggregation effects inherent in state-owned equity, without attaching administrative power to innovation investment decisions. The choice of innovative methods for private enterprises is often limited by limited innovative resources and cannot sustain continuous resource investment for exploratory innovation (C. Wang, Li, & Huang, 2022). The "political genes" objectively carried by state-owned equity help private enterprises to gain a place in policy welfare, increase the total amount of resources allocated by private enterprises for resource allocation, and transmit positive signals outwardly to optimize external survival conditions such as private enterprise financing. To resist external risks in a complex and changing market, private enterprises with strong market insights will correspondingly increase their exploratory innovation investment. Therefore, state-owned equity participation in private enterprises promotes development-oriented innovation investment through synergy.

As the proportion of state-owned equity holdings in private enterprises increases, the control ability of state-owned capital over private enterprises continues to increase, and the consistency between controlling state-owned equity and private enterprises in promoting development-oriented innovation investment declines. At the same time, based on signal timeliness, with the passage of time, the resource synergy incentive effect of state-owned equity participation in private enterprises is diluted, while the inhibitory effect of interest conflicts transmitted by redundant administrative decision-making logic in controlling state-owned equity increases. The shareholders and managers of privately-held or family-controlled private enterprises pursue relatively consistent interests such as short-term performance, while state-owned enterprise equity pursues short-term interests sacrificed in the process of maximizing social welfare. It is inevitable that it will increase the first type of agency costs. The intensification of agency costs will increase the level of financing constraints for private enterprises (H. Liu, Qi, & Wang, 2017). In the current situation where private enterprises' discourse power is reduced, funds for development-oriented innovation investment focusing on short-term profits are reduced. Based on innovation incentive policies, including financial support for special funds, integration of technology innovation alliances, industry chains and cluster resources, and unimpeded investment channels, their purpose is to solve "neck-blocking" problems. State-owned equity plays a leading role in this regard (Zhao & Yi, 2021). Therefore, exploratory innovation investment becomes a necessary choice for innovation investment under this ownership structure; state-owned equity and non-state-owned equity balance each other to alleviate governance problems such as "one dominant shareholder" and "internal control by insiders" within private enterprises (Ju, Dic, & Yu, 2013). The "political association" formed by state-owned equity forms effective supervision over the rationality of private enterprise innovation activities, which alleviates information asymmetry problems between external investors, small and medium shareholders, and enterprises. This is conducive to increasing exploratory innovation investment mentioned above.

Based on the above analysis, this article believes that the level of state-owned equity participation has an ambidexterity effect on development-oriented innovation investment. When the proportion of state-owned equity holdings is below a certain threshold, state-owned equity participation can bring about resource synergy incentives for private enterprises and promote development-oriented innovation investment; once it exceeds this threshold, while the incentive effect declines, interest conflict suppression effect plays a role, and controlling state-owned equity leads to a reduction in development-oriented innovation investment. In this process, controlling state-owned equity adheres to long-term goals pursuing social welfare maximization. Resource allocation has always been biased towards exploratory innovation investment. Therefore, hypothesis 2 and 3 are proposed.

Hypothesis 2: There is an inverted U-shaped relationship between the level of state-owned capital participation in private enterprises and development-oriented innovation investment.

Hypothesis 3: There is a linear positive correlation between the level of state-owned capital participation in private enterprises and exploratory innovation investment.

### **3 Data and Methodology**

#### *3.1 Data*

This study selected data from A-share private listed companies from 2007 to 2021 as the initial research sample. The starting point of the sample period was set as 2007, mainly because on January 1, 2007, listed companies began to implement new accounting standards that differed significantly from the old ones, and the disclosed information was more comparable during the sample period. To ensure the accuracy and rationality of the selected sample, the following screening and exclusion criteria were applied to the initial sample: (1) due to the special nature of the financial industry and financial report structure, financial industry samples were excluded; (2) ST and \*ST listed companies were excluded; (3) samples with abnormal or missing main variables and

missing control variable data were excluded. Through these processes, a total of 3602 valid observations were obtained.

The data on ambidexterity innovation investment, state-owned capital, financing constraints, agency costs, and other financial data used in this study were all obtained from the CSMAR database. To reduce the impact of extreme values on the research results, Winsor processing was performed on the continuous variables in the regression model at the 1% and 99% levels.

### 3.2 Measures

#### 3.2.1 Dependent Variables

Ambidexterity innovation investment (R&D). According to the provisions of Enterprise Accounting Standard No. 6 - Intangible Assets and its Application Guidelines, R&D investment by enterprises is classified into research and development stages, which are expensed and capitalized, respectively. Expensing is done because research-stage investments are riskier and uncertain compared to development-stage investments. Therefore, following the approach of Bi Xiaofang et al. (Bi, 2017), this study divided innovation investment into two stages: exploratory innovation investment (EI) and development innovation investment (DI). EI is represented by the ratio of R&D expenses to total assets, while DI is represented by the ratio of capitalized R&D expenses to total assets. The larger this ratio, the more an enterprise invests in innovation.

#### 3.2.2 Independent Variables

To understand the impact of reverse mergers and acquisitions on private enterprise innovation investment as much as possible, this study used whether a private enterprise has a state-owned shareholder (STATE1) and the total sum of state-owned shareholder holdings (STATE2) as explanatory variables. The specific definitions of these explanatory variables are as follows: state-owned shareholder holdings (STATE1) are defined as whether the top ten shareholders include state-owned shareholders. State-owned shareholders refer to shareholders whose nature is state-owned or state-owned legal persons, with a value of 1 if present and 0 otherwise. The total sum of state-owned shareholder holdings (STATE2) is measured by the sum of state-owned shareholder holding ratios among the top ten shareholders. In robustness tests, state ownership balance (STATE3) was used for variable substitution, with the ratio of state-owned shareholder holdings to non-state-owned shareholder holdings among the top ten shareholders used as its measure.

#### 3.2.3 Mediator Variable

Financing constraints (FC). To minimize potential endogeneity issues, this paper refers to the models established by Hadlock and Pierce (2009), Gu Leilei et al. (2020), and Chen Jun et al. (2020) to measure the degree of financing constraints in enterprises. Specifically, the FC index is adopted as a metric for financing constraints in private enterprises. Details are as follows:

$$P(QUFC = 0|Z_{i,t}) = \frac{e^{Z_{i,t}}}{1 + e^{Z_{i,t}}}$$

$$Z_{i,t} = a_0 + a_1 size_{i,t} + a_2 lev_{i,t} + a_3 \left(\frac{CashDiv}{ta}\right)_{i,t} + a_4 MB_{i,t} + a_5 \left(\frac{NWC}{ta}\right)_{i,t} + a_6 \left(\frac{EBIT}{ta}\right)_{i,t}$$

Among these variables, “size” represents the enterprise asset scale, measured by the natural logarithm of total assets; “lev” stands for the enterprise financial leverage ratio, calculated as total liabilities divided by total assets; “CashDiv” refers to the cash dividends paid by the company in the current year; “MB” indicates the market-to-book ratio of the enterprise, which is the ratio of market value to book value; “NWC” stands for net working capital, calculated as operating capital minus monetary funds and short-term investments; “EBIT” represents earnings before interest and taxes; and “ta” stands for total assets.

In the first step, we standardize the three variables of company size, company age, and cash dividend payout ratio on an annual basis. Then, we sort the listed companies based on the mean values of the standardized variables in ascending order. The upper and lower tertile points are used as the cutoff points for financing constraints to determine the dummy variable QUFC. Companies with values above the 66% tertile are defined as the low financing constraint group with QUFC=0, while those below the 33% tertile are defined as the high financing constraint group with QUFC=1. In the second step, we perform a Logit regression on model to fit the probability P of financing constraints occurring for each year of the enterprise. This probability is then defined as the financing constraint index FC, with values ranging from 0 to 1. A higher FC value indicates more severe financing constraints for the enterprise.

### 3.2.4 Moderator Variable

Agency costs (AGENCY). Following Peng et al.'s approach (Peng, 2011), agency costs were measured by the ratio of other receivables to total assets. Other receivables reflect agency costs arising from entrusted agency relationships, such as large shareholders' embezzlement of funds. The larger AGENCY, the more severe an enterprise's agency problems.

### 3.2.5 Control Variables

For control variable selection (Luo & Qin, 2019; X. Ma et al., 2021), this study selected six variables at the company's basic characteristic level: enterprise size (SIZE), enterprise age (AGE), capital structure (LEV), growth potential (GROWTH), profitability (ROA), and cash flow (CFO); and four variables at the company governance characteristic level: equity concentration (LARGEST), CEO-chairman ambidexterity (AMBIDEXTERITY), management ownership ratio (MANO), and independent director ratio (BIND).

In addition, this study set industry and year dummy variables to control for industry and time effects.

The specific variable definitions are shown in Table 1.

Table 1. Variable definitions

Variable Type	Variable	Variable symbol	Description & Construction
Dependent variable	Exploratory Innovation Investment	EI	Amount of R&D investment expenses/ Total assets*100
	Developmental Innovation Investment	DI	Amount of R&D investment capitalization/ Total assets*100
Independent variable	State-owned equity	STATE1	Whether private enterprises participate in "reverse mixed ownership reform", 1 is assigned if there are state-owned shareholders among the top ten shareholders, otherwise 0 is assigned. State-owned shareholders refer to those whose shareholder nature is the state or state-owned legal person.
	The total shareholding of state-owned shareholders	STATE2	Degree of "reverse mixed-ownership reform" of private enterprises, the sum of the shareholding ratios of state-owned shareholders among the top ten shareholders.
	The degree of balance of state-owned equity	STATE3	Degree of "reverse mixed-ownership reform" of private enterprises, the ratio of the shareholding of state-owned shareholders among the top ten shareholders to the shareholding of private shareholders.
Mediator Variable	Financing constraints	FC	As previously mentioned.
Moderator Variable	Agency cost	AGENCY	Ratio of other receivables to total assets
	Privatization method	PRI	A private enterprise that is owned by a natural person or a private enterprise at the time of listing is directly privatized; otherwise, it is indirectly privatized.
Control variables	Enterprise scale	SIZE	Total assets at the end of the period in natural logarithms
	Enterprise age	AGE	The difference between the current year minus the year of incorporation is taken as the natural logarithm.
	Equity concentration	LARGEST	Shareholding ratio of the largest shareholder
	Combination of two positions in one	AMBIDEXTERITY	The chairman and general manager of the company are the same person take 1, otherwise 0
	Management shareholding ratio	MANO	Ratio of number of shares held by directors and supervisors to total number of shares
	Proportion of independent directors	BIND	Ratio of the number of independent directors to the size of the board of directors of the company
	Capital structure	LEV	Ratio of total corporate liabilities to total assets
	Growth potential	GROWTH	Amount of the Company's operating income for the current year for the current period - Amount of operating income for the same period of the previous year to the amount of operating income for the same period of the previous year
	Profitability	ROA	Ratio of the company's net profit to the balance of shareholders' equity
	Cash flow	CFO	Net cash flow from operating activities for the year to total assets at the end of the period
	Annual fixed effects	YEAR	Control year
	Industry fixed effects	INDUSTRY	Control industry

### 3.3 Econometric Model

To test hypotheses 1a and 1b on the impact of China's equity diversity on the ambidexterity innovation investment of private enterprises, this study constructed a panel data model (1) to be tested, following the approach of Bi Xiaofang et al. (Bi, 2017):

$$R\&D_{i,t}=\alpha_0+\alpha_1STATE1_{i,t}+\alpha_2CONTORL_{i,t}+\sum YEAR+\sum INDUSTRY+\varepsilon_{i,t} \quad (1)$$

where  $R\&D_{i,t}$  is the dependent variable, representing the ambidexterity innovation investment of enterprise  $i$  in year  $t$ , including exploratory innovation investment (EI) and development innovation investment (DI).  $\alpha_0$  is the constant term,  $\alpha_1$  is the coefficient of the core explanatory variable, state-owned equity participation ( $STATE1_{i,t}$ ), which is the focus of this study.  $CONTORL_{i,t}$  represents all control variables, and  $\varepsilon_{i,t}$  is the residual term. This study controlled for year and industry to avoid possible testing bias due to missing variables.

To test hypotheses 2a and 2b on the impact of the total sum of state-owned shareholder holdings on the ambidexterity innovation investment of private enterprises, this study further constructed a model to be tested (2a/2b) following the approach of Xu Liping et al. (Y. Liu, Zhang, & Lan, 2016):

$$EI/DI_{i,t}=\beta_0+\beta_1STATE2_{i,t}+\beta_2(STATE2_{i,t})^2+\beta_3CONTORL_{i,t}+\sum YEAR+\sum INDUSTRY+\varepsilon_{i,t} \quad (2a)$$

$$EI_{i,t}=\gamma_0+\gamma_1STATE2_{i,t}+\gamma_2CONTORL_{i,t}+\sum YEAR+\sum INDUSTRY+\varepsilon_{i,t} \quad (2b)$$

where  $STATE2_{i,t}$  is the explanatory variable for equity balance, and the meanings of other variables are consistent with those described above.

## 4 Results

### 4.1 Sample Characteristics

Table 2 provides descriptive statistics for 3602 observations of 978 privately owned listed companies. From Table 2, it can be seen that the minimum values for the proportion of exploratory innovation investment and development innovation investment to total assets are both 0, while the maximum values are 14.61% and 3.03%, respectively. This indicates that the level of ambidexterity innovation investment in private enterprises is relatively low and needs to be further improved. The average values are 2.35% and 0.21%, and the medians are 1.92% and 0, respectively, indicating that there is a certain gap between the two. The overall level of exploratory innovation investment is relatively high, but more than half of the sample companies did not engage in development innovation investment. The mean value of the explanatory variable indicating the participation of state-owned shareholders ( $STATE1$ ) is 0.4328, indicating that state-owned shareholders participate in 43.28% of the sample private enterprises, and more than half of the top ten shareholders of private enterprises do not include state-owned shareholders. This suggests that there is further room for implementation of reverse mergers and acquisitions policy. The maximum value of state-owned equity holdings ( $STATE2$ ) is 61.64%, while the average is only 4.26% with a standard deviation of 0.1056, indicating that state-owned equity plays a relatively large role as a shareholder in private enterprises, and the degree of participation of state-owned capital in different private enterprises varies significantly. The mean value of state-owned equity balance ( $STATE3$ ) is 0.3856, indicating that the integration of state-owned equity and private equity in China's private enterprises is generally not high. The median and minimum values are both 0, while the maximum value is 14.23, indicating that a small number of private enterprises have a higher proportion of state-owned equity, further confirming the large differences in mixed ownership among different private enterprises. To ensure the reliability of regression results, this paper introduces important factors that affect state-owned equity participation in private enterprises and ambidexterity innovation investment as control variables, and the statistical results are within the normal range.



Table 2. Descriptive statistics of variables

Variable	Observation	average	standard	median	min	max
EI	3602	2.3539	2.2726	1.9239	0.0039	14.6092
DI	3602	0.2065	0.5188	0.0000	0.0000	3.0266
STATE1	3602	0.4328	0.4955	0.0000	0.0000	1.0000
STATE2	3602	0.0426	0.1056	0.0000	0.0000	0.6164
STATE3	3602	0.3856	1.8272	0.0000	0.0000	14.2300
SIZE	3602	22.0703	1.1460	21.9310	19.9080	25.2695
AMBIDEXTERITY	3602	0.3945	0.4888	0.0000	0.0000	1.0000
MANO	3602	0.1923	0.2223	0.0836	0.0000	0.7559
BIND	3602	0.3756	0.0482	0.3636	0.3333	0.5000
CFO	3602	0.0566	0.0700	0.0552	-0.1529	0.2495
LARGEST	3602	0.3372	0.1429	0.3161	0.0814	0.7004
LEV	3602	0.3961	0.2007	0.3804	0.0563	0.9454
ROA	3602	0.0772	0.1227	0.0862	-0.6612	0.3514
GROWTH	3602	0.1788	0.3746	0.1287	-0.5106	2.4747
AGE	3602	18.6555	5.5182	19.0000	7.0000	33.0000

This article also checked the correlation between the dependent variable and the explanatory variable. The variable correlation test showed that the correlation coefficient between state-owned equity participation (STATE1) and innovation investment of private enterprises (EI/DI) was significantly positive at the 1% level, indicating that there is a certain positive impact of state-owned equity participation in private enterprises on ambidexterity innovation investment, which preliminarily supports hypothesis 1.

#### 4.2 Main Results and Discussion

##### 4.2.1 The Effect of State-Owned Equity and Ambidexterity Innovation of Private Enterprises

To test the effect of state-owned equity participation on exploratory and development innovation investment in private enterprises, this paper first uses whether state-owned shareholders participate in equity (STATE1) to regress the entire sample according to model (1). The regression results are shown in Table 3. Columns (2) show the regression results of the effect of state-owned equity participation on exploratory innovation investment in private enterprises. Column (1) shows the regression results after controlling for year and industry, and the correlation coefficient between state-owned equity participation and exploratory innovation investment in private enterprises is 0.2352, which is significant at the 1% level. Columns (2) show the regression results of the effect of state-owned equity participation (STATE1) on development innovation investment in private enterprises with controlling for year and industry, respectively. State-owned equity participation (STATE1) is positively significant at the 1% level in both cases.

In summary, state-owned equity participation in private enterprises has a positive and significant effect on both exploratory and development innovation investment, which verifies hypotheses H1a and H1b. As an investment project with a long investment cycle and high risk of failure, innovation has a high resource dependence and consumption in its continuous operation. The resource effect brought by establishing a "symbiotic relationship" with state-owned equity participation in private enterprises increases the total resources of private enterprises and enhances their willingness to invest. Whether upgrading existing products and services or developing new ones, state-owned equity participation significantly increases their investment in innovation, enabling private enterprises to continuously respond to market changes through development innovation investment while ensuring exploratory innovation investment for potential market changes that can lead to significant technological changes.

Table 3. The regression independent variable – state-owned equity (STATE1).

Variable	EI (1)	DI (2)
STATE1	0.2352*** (3.1783)	0.0878*** (4.7930)
SIZE	-0.1681*** (-4.5329)	0.0565*** (6.1508)
AMBIDEXTERITY	0.1421** (2.0015)	0.0596*** (3.3888)
MANO	0.3760** (2.1564)	-0.1469*** (-3.4023)
BIND	0.0641 (0.0921)	-0.0851 (-0.4938)
CFO	2.2105*** (4.1642)	-0.3435*** (-2.6135)
LARGEST	-0.1132 (-0.4660)	-0.0542 (-0.9011)
LEV	-0.7484*** (-3.6073)	-0.0504 (-0.9810)
ROA	1.0377*** (3.3210)	-0.2141*** (-2.7679)
GROWTH	0.3885*** (4.2047)	-0.0088 (-0.3850)
AGE	-0.0436*** (-6.3824)	-0.0022 (-1.3206)
INDUSTRY	YES	YES
YEAR	YES	YES
CONSTANT	3.8875*** (3.2812)	-0.0942 (-0.3212)
N	3,602	3,602
ADJ-R <sup>2</sup>	0.2532	0.1217

Note. \*, \*\*, \*\*\* respectively indicate significance at the 10%, 5%, and 1% levels. (the same below).

#### 4.2.2 The Effect of the Level of State-Owned Equity Holdings and Ambidexterity Innovation Investment of Private Enterprises

To further investigate the impact of state-owned equity participation on the ambidexterity innovation investment of private enterprises, this article first regresses using the total proportion of state-owned shareholders (STATE2) according to model (2a). Model (2a) tests the inverted U-shaped relationship between the total proportion of state-owned shareholders and exploratory and development innovation investment of private enterprises. Using OLS estimation, the regression results are shown in columns (1) (2) of Table 4. Column (1) shows the impact of the total proportion of state-owned shareholders on exploratory innovation investment of private enterprises while controlling for the industry and year. The results show that the first-order correlation coefficient of the total proportion of state-owned shareholders on exploratory innovation investment of private enterprises is 1.5502, and the second-order correlation coefficient is -2.6236, both of which are not significant at the 10% level, indicating that there is no clear inverted U-shaped relationship between the two. Columns (2) represent regression results with controlling for year and industry. And the coefficients, 1.3074 and 1.5784, are significantly negative at the 1% level, which indicates that there is an inverted U-shaped relationship between the total proportion of state-owned equity and development innovation investment of private enterprises, and it is significant at the 1% level according to the u-test. This result supports hypothesis H2a, where the horizontal and vertical coordinates represent the total proportion of state-owned equity shareholders and development innovation investment of private enterprises, respectively. When the proportion of state-owned equity shareholders increases, development innovation investment increases; when the proportion continues to increase, development innovation investment of private enterprises decreases. Furthermore, model (2b) tests the linear relationship between the total proportion of state-owned shareholders and exploratory innovation investment. The regression results are shown in columns (3) and (4) of Table 4. Column (3) represents the regression results

for the entire sample while controlling for year and industry. The coefficient of the total proportion of state-owned shareholders (STATE2) is 0.3132, which is not significant at the 10% level. In November 2013, the Third Plenary Session of the Eighteenth Central Committee of the Communist Party of China formally proposed "accurately defining the functions of different state-owned enterprises," and mixed-ownership reform entered a new stage of classified reform. Using companies from 2014 to 2021 as a research sample, regression is performed again to test the correlation coefficient between the total proportion of state-owned shareholders (STATE2) and exploratory innovation investment (EI), which is 0.4246 and significant at the 10% level. This indicates that there is a significant positive correlation between the total proportion of state-owned equity shareholders and exploratory innovation investment of private enterprises, supporting hypothesis H2b.

After briefly considering other variables' effects, the expression for the quadratic function of the inverted U-shaped relationship mentioned above in column (2) is  $Y = -1.5784X^2 + 0.9017X$ , where Y represents development innovation investment of private enterprises, X represents the total proportion of state-owned equity shareholders' value, and the curve's axis of symmetry is  $X = 0.2856$ . Therefore, when the proportion of state-owned equity is less than 28.56%, an increase in state-owned equity promotes an increase in development innovation investment of private enterprises; when the proportion is greater than 28.56%, an increase in proportion will weaken development innovation investment. As shown in column (4), the regression correlation coefficient of the total proportion of state-owned equity shareholders (STATE2) is 0.4246, and the ratio between it and exploratory innovation investment's mean value in private enterprises is 0.1804, indicating that an increase in state-owned equity's proportion leads to an average increase in exploratory innovation investment by 18.04%.

In summary, development innovation investment of private enterprises shows an inverted U-shaped relationship with a continuous increase in state-owned equity shareholders' proportion, while exploratory innovation investment increases with an increase in state-owned equity shareholders' proportion, showing a positive linear relationship. The reason behind this may be that under the consensus that state-owned shareholders not only pursue economic benefits but also have tasks to achieve political goals, state-owned shareholders acting as government agents have a varying impact on ambidexterity innovation investment in private enterprises depending on their number. When the proportion of state-owned equity shareholders is low, state-owned shareholders play a positive role in promoting ambidexterity innovation in private enterprises by exerting their objective resource effects; when it reaches a "maximum value" where further increases do not change utility functions, state-owned shareholders play a negative role in inhibiting development innovation investment while positively promoting exploratory innovation investment. These conclusions also indirectly illustrate that in the process of exerting governance effects, state-owned shareholders have a tendency to respond to policy calls by continuously increasing exploratory innovation project investments to seek core competitive advantages for enterprises.

Table 4. The regression independent variable – the level of state-owned equity (STATE2)

Variable	EI (1)	DI (2)	EI (3)	(4)
STATE2	1.5502 (1.5957)	0.9017*** (3.7486)	0.3132 (1.3776)	0.4246* (1.7433)
STATE2 <sup>2</sup>	-2.6236 (-1.3652)	-1.5784*** (-3.3170)		
SIZE	-0.1464*** (-4.0275)	0.0639*** (7.1044)	-0.1439*** (-3.6744)	-0.1495*** (-3.5967)
AMBIDEXTERITY	0.1415** (1.9857)	0.0605*** (3.4294)	0.1391* (1.8978)	0.1031 (1.3480)
MANO	0.3257* (1.8704)	-0.1585*** (-3.6747)	0.3048* (1.8330)	0.3558** (2.0762)
BIND	0.0215 (0.0309)	-0.0902 (-0.5229)	-0.0129 (-0.0167)	-0.1677 (-0.2024)
CFO	2.2423*** (4.2194)	-0.3316** (-2.5196)	2.2376*** (3.2567)	2.0694*** (2.8541)
LARGEST	-0.0844 (-0.3324)	-0.0229 (-0.3648)	-0.1837 (-0.8221)	-0.2379 (-1.0004)
LEV	-0.7547***	-0.0519	-0.7666***	-0.7030***

	(-3.6204)	(-1.0046)	(-3.1005)	(-2.6407)
ROA	1.0557***	-0.2046***	1.0466**	0.9955**
	(3.3728)	(-2.6399)	(2.3503)	(2.1020)
GROWTH	0.3908***	-0.0077	0.3895***	0.4112***
	(4.2250)	(-0.3345)	(2.9268)	(2.8374)
AGE	-0.0429***	-0.0021	-0.0426***	-0.0432***
	(-6.2214)	(-1.2501)	(-5.9093)	(-5.8196)
INDUSTRY	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
CONSTANT	3.5988***	-0.2088	3.6242***	4.9584***
	(3.0405)	(-0.7124)	(3.6029)	(4.9742)
N	3,602	3,602	3,602	3,305
ADJ-R <sup>2</sup>	0.2514	0.1193	0.2606	0.2512

### 4.3 Geneity and Robustness Checks

#### 4.3.1 Endogeneity

##### 4.3.1.1 Propensity score matching (PSM)

Considering the endogeneity problem caused by sample selection bias on the regression results, this paper uses Propensity Score Matching (PSM) to process the research sample to eliminate systematic differences between state-owned equity participating and non-participating private enterprises. Specifically, referring to the research of Zhou Kaitang et al. (Y. Liu et al., 2016; Zhou, Ma, & Wu, 2017), this paper conducts a propensity score matching test on the sample and performs regression tests on the matched sample. This paper uses the Logit model for one-to-three nearest neighbor matching. The balance test (PSTEST) results of the processed group and the control group after matching are shown in Table 5. The test results show that the standard errors of the covariates after matching are all less than 10%, and the absolute values of the standard errors decrease, indicating that the selected matching variables and matching methods are reasonable. Moreover, most of the T statistics after matching are not significant. Since a significant T value indicates a significant difference between the two groups, the non-significance of T values indicates that there is no significant difference between the variables after matching in the processed group and the control group, ensuring the randomness of the sample processing and solving the self-selection bias mentioned above, thus ensuring the reliability of the empirical conclusions.

Using propensity score matching, a control group with similar characteristics to the processed group is obtained, with a total of 2986 observations between the two groups. Regression results using the matched sample are shown in Table 6. Columns (1) and (2) show that the coefficients of the dummy variable (STATE1) for state-owned equity participation are both significantly positive at the 1% level, consistent with the previous analysis. Columns (3), (4), and (5) represent the relationship between the total proportion of state-owned shareholders (STATE2) and ambidexterity innovation investment of private enterprises. When the dependent variable is DI, STATE2 is significantly positively correlated, STATE22 is significantly negatively correlated, and the correlation coefficient between STATE2 and EI is significantly positive at the 10% level, which validates hypotheses H2a and H2b again. Overall, after controlling for endogeneity using PSM, the conclusions of this study remain unchanged.

Table 5. Results of the PSTEST between the treatment and control groups

Variable	Observation	Averages		Standard errors (%)	Absolute reduction of standard errors (%)	T-test	
		treatment	control			T-values	P-values
SIZE	unmatched	22.5200	21.7300	72.40	91.00	21.85	0.000
	matched	22.5200	22.5900	-6.500		-1.64	0.101
AMBIDEXTERITY	unmatched	0.3110	0.4580	-30.60	85.20	-9.05	0.000
	matched	0.3110	0.3330	-4.50		-1.30	0.193
MANO	unmatched	0.1110	0.2540	-68.80	89.80	-20.11	0.000
	matched	0.1110	0.1260	-7.00		-2.27	0.023
BIND	unmatched	0.3710	0.3790	-15.60	85.10	-4.62	0.000

	matched	0.3710	0.3700	2.30		0.67	0.506
CFO	unmatched	0.0569	0.0563	0.90	-111.40	0.26	0.798
	matched	0.0569	0.0556	1.80		0.52	0.602
LARGEST	unmatched	0.3220	0.3490	-19.10	93.00	-5.70	0.000
	matched	0.3220	0.3240	-1.30		-0.37	0.709
LEV	unmatched	0.4390	0.3630	38.10	90.20	11.41	0.000
	matched	0.4390	0.4460	-3.700		-1.040	0.299
ROA	unmatched	0.0726	0.0807	-6.60	29.30	-1.97	0.048
	matched	0.0726	0.0668	4.60		1.19	0.233
GROWTH	unmatched	0.1770	0.1800	-0.90	-339.40	-0.28	0.780
	matched	0.1770	0.1920	-4.10		-1.09	0.278
AGE	unmatched	19.8800	17.7200	40.00	94.30	11.87	0.000
	matched	19.8800	20.0000	-2.30		-0.610	0.541

Table 6. Regression results of hypothesis 1 hypothesis 2 after PSM matching

Variable	H 1		H 2		EI
	EI	DI	DI		
	(1)	(2)	(3)	(4)	(5)
STATE1	0.2462*** (3.2181)	0.0840*** (4.2059)			
STATE2			0.7394*** (2.8101)	0.8330*** (3.2488)	0.4272* (1.9000)
STATE2 <sup>2</sup>			-1.1059** (-2.1469)	-1.4557*** (-2.8736)	
CONTROLS	YES	YES	YES	YES	YES
INDUSTRY	YES	YES	NO	YES	YES
YEAR	YES	YES	NO	YES	YES
CONSTANT	3.2780*** (2.6462)	-0.1090 (-0.3371)	-0.3102 (-1.3265)	-0.2097 (-0.6472)	3.0911*** (2.9251)
N	2,986	2,986	2,986	2,986	2,986
ADJ-R2	0.2683	0.1156	0.0310	0.1132	0.2769

#### 4.3.1.2 Lagged Regression

Considering the possible reverse causality between state-owned equity participation and ambidexterity innovation investment of private enterprises, this paper processes all dependent variables one period ahead and re-examines the relationship between the two. The results are shown in Table 9, where columns (1)-(4) represent the regression results of state-owned equity participation (STATE1) on the lagged ambidexterity innovation investment of private enterprises. Columns (2) and (4) show that the results are significantly positive at the 1% level after controlling for year and industry, supporting the research conclusion related to hypothesis 1. Columns (5)-(8) represent the regression results of the degree of state-owned equity participation (STATE2) on the lagged ambidexterity innovation investment of private enterprises. Columns (5) and (6) indicate that there is no inverted U-shaped relationship between STATE2 and F.EI, and there is an inverted U-shaped relationship between STATE2 and F.DI. Column (7) shows that there is no significant linear relationship between STATE2 and EI, but after adjusting the sample period to 2014-2021 to account for the impact of the 2014 mixed-ownership reform policy, the regression result is significantly positive at the 5% level, which still supports the research conclusion related to hypothesis 2.

Table 7. The results of Lagged regression

Variable	(1) F.EI	(2)	(3) F.DI	(4)	(5) F.EI	(6) F.DI	(7) F.EI	(8)
STATE1	0.1260 (1.3070)	0.2920*** (3.2362)	0.0970*** (3.7954)	0.0819*** (3.2802)				
STATE2					2.1090* (1.8134)	0.8249** (2.5664)	0.3924 (1.5365)	0.5747** (2.0044)
STATE2 <sup>2</sup>					-3.5847 (-1.5757)	-1.7227*** (-2.7398)		
CONTROL	YES	YES	YES	YES	YES	YES	YES	YES
INDUSTRY	NO	YES	NO	YES	YES	YES	YES	YES
YEAR	NO	YES	NO	YES	YES	YES	YES	YES
CONSTANT	5.3178*** (4.8846)	1.7101 (0.9364)	-0.2298 (-0.7965)	-1.0331** (-2.0450)	1.4438 (0.7900)	-1.1209** (-2.2190)	1.4543 (1.3648)	3.4414*** (3.0154)
N	2,396	2,396	2,396	2,396	2,396	2,396	2,396	2,198
ADJ-R <sup>2</sup>	0.0767	0.2300	0.0391	0.1272	0.2274	0.1256	0.2408	0.2330

4.3.3 Robustness Checks

To verify the reliability of the benchmark regressions, the paper also performs the following robustness tests.

4.3.3.1 Replacement Regression Model

The dependent variables, exploratory innovation investment (EI) and exploitative innovation investment (DI), are both left-censored at 0. Following the approach of Du Li et al. (Du & Qian, 2021), this paper uses the estimation method of the Tobit model to solve the potential bias caused by "left-censoring". The mixed Tobit model and random utility Tobit model are used, and marginal effect tests are conducted. The results are shown in Table 7, where the coefficients of STATE1 are significantly positive, indicating that state-owned equity participation in private enterprises (STATE1) has a significant impact on both exploratory and exploitative innovation investment of private enterprises, which is consistent with the previous analysis and test results.

Table 8. The result of TOBIT model test

Dependent Variable	EI			DI		
	Hybrid Tobit	Random effects Tobit	Margin effect	Hybrid Tobit	Random effects Tobit	Margin effect
Model	(1)	(2)	(3)	(4)	(5)	(6)
STATE1	0.2352*** (3.1988)	0.0757* (1.6935)	0.0757* (1.6935)	0.2616*** (5.3302)	0.1128*** (2.6522)	0.1128*** (2.6522)
CONTROL	YES	YES	YES	YES	YES	YES
INDUSTRY	YES	YES	YES	YES	YES	YES
YEAR	YES	YES	YES	YES	YES	YES
CONSTANT	3.8875*** (3.3024)	13.0062*** (11.3689)	13.0062*** (11.3689)	-3.6915*** (-4.8199)	-5.1757*** (-5.8767)	-5.1757*** (-5.8767)
N	3602	3602	3602	3602	3602	3602
NUMBER OF STKCD		978	978		978	978

4.3.3.4 Replacing the Dependent Variables

Considering the impact of the definition of independent variables on the regression results, this paper conducts robustness tests by replacing the measurement method of the dependent variables. The degree of state-owned equity balance is used to measure the degree of state-owned equity participation in private enterprises, representing the vertical depth of the reform of "reverse mixed ownership" in which private enterprises participate. It is included in the regression model for robustness tests. The results are shown in Table 8, where columns (1) and (2) represent the test of the inverted U-shaped relationship between the degree of state-owned equity balance and exploratory and exploitative innovation investment, respectively. The coefficient in column (1) is not significant at the 10% level, while the coefficient of the first-order term of state-owned equity balance (STATE3) in column (2) is significantly positive at the 5% level, and the coefficient of the second-order term is significantly negative at the 1% level, indicating an inverted U-shaped relationship between the two, which is

consistent with the previous conclusion. Column (3) shows that the linear relationship between state-owned equity balance and exploratory innovation investment of private enterprises does not pass the test.

Table 9. The result of replacing the dependent variables

Variable	EI (1)	DI (2)	EI (3)
STATE3	0.0319 (0.4260)	0.0447** (2.4140)	0.0011 (0.0490)
STATE3 <sup>2</sup>	-0.0028 (-0.4799)	-0.0038*** (-2.6753)	
CONSTANT	3.5919*** (3.0262)	-0.2453 (-0.8343)	4.8907*** (4.1202)
N	3,602	3,602	3,305
R-squared	0.260	0.129	0.251

### 5. Further Study

The previous sections provided theoretical explanations and tests from two aspects of equity subject diversity and equity integration balance on the causal relationship between state-owned equity and ambidexterity innovation investment of private enterprises. Specifically, state-owned equity participation in private enterprises has a positive impact on both exploratory and exploitative innovation investment, and the total shareholding of state-owned shareholders has an inverted U-shaped relationship with exploitative innovation investment, while showing a linear positive impact on exploratory innovation investment. In the following section, this paper will further explore the channels and mechanisms of the impact of state-owned equity on ambidexterity innovation investment.

#### 5.1 Mediating Effect of Financing Constraints

State-owned equity participation in private enterprises can effectively alleviate financing constraints of private enterprises, enabling them to obtain resources that can increase their level of ambidexterity innovation investment. The financing capacity of enterprises largely affects their investment behavior (M. Yu, Zhong, & Fan, 2019). Under intense market competition, whether to invest in innovative projects becomes a key choice affecting the survival and development of enterprises. Financing constraints have become a constraining factor for the current state of innovation activities, particularly for private enterprises with insufficient R&D investment (X. Wu, Liang, Li, & Jiang, 2018). State-owned equity participation in private enterprises is mainly based on its political attributes and resource effects to alleviate financing constraints of private enterprises (W. Yu, Wang, & Jin, 2012). In an incomplete market, the government plays an important role in allocating scarce resources. Compared with state-owned enterprises, the lack of political connections makes private enterprises disadvantaged in obtaining resources. State-owned shareholders' participation in private enterprises helps private enterprises establish a symbiotic relationship with the government, not only directly leveraging the resource advantages of state-owned equity to expand financing channels, but also implying the existence of a "government endorsement" that provides implicit guarantees for the stable future cash flows of enterprises (Faccio, 2006), sending positive signals to the market, which is conducive to obtaining credit resources and reducing financing costs. Therefore, this paper believes that state-owned equity participation has a negative impact on the level of financing constraints, which is conducive to transforming the resources brought by state-owned equity into innovation investment.

This paper draws on the test of mediating effects by Wen Zhonglin and Ye Baojuan to construct models (1) to (3) to test the above arguments.

$$EI/DI_{i,t} = \alpha_0 + \alpha_1 STATE1_{i,t} + \alpha_2 CONTORL_{i,t} + \sum YEAR + \sum INDUSTRY + \varepsilon_1 \tag{1}$$

$$SA = \beta_0 + \beta_1 STATE1_{i,t} + \beta_2 CONTORL_{i,t} + \sum YEAR + \sum INDUSTRY + \varepsilon_2 \tag{2}$$

$$EI/DI_{i,t} = \gamma_0 + \gamma_1 STATE1_{i,t} + \gamma_2 FC_{i,t} + \gamma_3 CONTORL_{i,t} + \sum YEAR + \sum INDUSTRY + \varepsilon_3 \tag{3}$$

According to the three-step test process proposed by Wen Zhonglin and Ye Baojuan (Wen & Ye, 2014), the channel of financing constraints in the impact of state-owned equity participation on ambidexterity innovation investment of private enterprises was tested, and the corresponding regression results were reported sequentially, as shown in Table 10. This study tested whether financing constraints played a mediating role between the

participation of state-owned equity (STATE1) and ambidextrous innovation investment (EI/DI) in private enterprises using the aforementioned model. The verification results in Table 4 of the previous text have already indicated that the participation of state-owned equity has a positive impact on ambidextrous innovation investment in private enterprises, laying a foundation for further exploring the underlying mechanisms between the two. The coefficient of STATE1 in column (1) of model (2) tested was -0.1618, significantly negative at the 1% level, indicating that the participation of state-owned equity helps alleviate financing constraints in private enterprises. According to the regression results in columns (2) and (3) of model (3), the coefficients of FC were -0.0114 and -0.0015, respectively, both significant at the 1% level, indicating that the indirect effect is significant and that the mediating role of financing constraints between the two has been verified. In column (2), the coefficient of STATE1, 0.0002, was not significant, indicating that financing constraints played a complete mediating role between the participation of state-owned equity and exploratory innovation investment. However, in column (3), the coefficient of STATE1, 0.0018, was significantly positive at the 5% level, indicating that financing constraints only played a partial mediating role between the participation of state-owned equity and exploitative innovation investment.

Table 10. The results of mediating effect of financing constraints

Variable	(1) FC	(2) EI	(3) DI
STATE1	-0.1618*** (-4.9421)	0.0002 (0.0599)	0.0018** (2.0503)
FC		-0.0114*** (-6.4389)	-0.0015*** (-3.2968)
CONTROL	YES	YES	YES
INDUSTRY	YES	YES	YES
YEAR	YES	YES	YES
CONSTANT	10.3946*** (43.7698)	-0.0220*** (-2.8430)	0.2474*** (7.9605)
N	3,602	3,602	3,602
R <sup>2</sup>	0.614	0.126	0.268

### 5.2 Moderating Effect of Agency Costs

In the absence of a perfect capital market, agency problems and the resulting information asymmetry can lead to external financing costs being higher than internal financing costs. The two are not completely substitutable, and the previous text also verified the channel mechanism effect of financing constraints between state-owned equity participation and ambidexterity innovation investment of private enterprises. Does the agency cost itself have a heterogeneous impact on the main effect between the two? This paper divides the baseline regression model into high and low groups based on the median of agency costs and examines the role of agency costs in the impact of state-owned equity participation on ambidexterity innovation investment of private enterprises. It verifies whether the impact of state-owned equity participation will differ due to different agency costs.

Based on the principal-agent theory, agency conflicts caused by information asymmetry (Holmström, 1979) lead to agency costs, which are an important reason for insufficient innovation investment by private enterprises. Compared with state-owned enterprises, there are higher agency costs between private enterprise owners and managers, and between major shareholders and minority shareholders. The higher the agency costs (Block, 2012), the more serious the conflicting interests in these two types of agency relationships. As decision-makers for resource investment, managers will reduce resource investment in high-risk innovation activities to maintain their own interests. When agency costs decrease, the reverse selection of managers will decrease, and resource investment in ambidexterity innovation for long-term competitiveness of the enterprise will be considered, which is conducive to increasing enterprise value. Based on Peng et al.'s (Peng, 2011) research, agency problems are mainly reflected in other receivables. Therefore, this paper uses the ratio of enterprise receivables to total assets to measure enterprise agency costs and divides the entire sample into low and high agency cost groups for testing according to the main regression model (1).

Table 11 reports the results of grouped regression. Columns (1) and (3) show that in the low agency cost group, state-owned equity participation (STATE1) has a significant impact on exploratory innovation investment and



exploitative innovation investment at the 1% and 5% levels, respectively. Columns (2) and (4) show that in the high agency cost group, the coefficient of state-owned equity participation (STATE1) is not significant for exploratory innovation investment, but its impact on exploitative innovation investment is still significantly positive at the 1% level. It can be seen that the high and low agency costs have significant heterogeneous effects on the positive relationship between state-owned equity participation and exploratory innovation investment, and agency costs have a negative moderating effect on the relationship between the two. Since state-owned equity participation has a significant impact on exploitative innovation investment in both high and low agency cost groups, this paper further conducts component heterogeneity tests and finds that the coefficient of 0.0362 is significant at the 1% level, indicating that agency costs also play an inhibitory role between state-owned equity participation and exploitative innovation investment. In summary, agency costs play a moderating effect in the relationship between state-owned equity participation and ambidexterity innovation investment.

Table 11. The result of moderating effect of agency costs

Variable	EI		DI	
	(1)	(2)	(3)	(4)
STATE1	0.3151*** (3.3463)	0.1781 (1.5466)	0.0502** (2.3392)	0.1284*** (4.3399)
CONTROL	YES	YES	YES	YES
INDUSTRY	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
CONSTANT	4.2660** (2.5526)	4.1189** (2.2458)	-0.5207 (-1.3658)	0.2891 (0.6136)
N	1,801	1,801	1,801	1,801
ADJ-R <sup>2</sup>	0.260	0.282	0.125	0.160
Component Variability Analysis	—		0.0362	

### 5.3 Heterogeneity Test of Privatization Methods

Based on the previous analysis, state-owned equity participation has a positive effect on ambidexterity innovation investment of private enterprises, and the level of state-owned equity participation has a non-linear inverted U-shaped relationship and a linear relationship with exploratory innovation investment and exploitative innovation investment, respectively. Currently, in the critical period of the three-year action plan for state-owned enterprise reform launched in 2020, equity optimization is a key means to promote the improvement of governance mechanisms and break through governance obstacles. This paper empirically tests the positive and active impact of state-owned capital participation in private enterprises on ambidexterity innovation investment. If a private enterprise controlled by a natural person or a private enterprise initiates an IPO, then the implementation of reverse mixed ownership reform will bring about state-owned equity participation, which is like "fresh blood" for this type of private enterprise. Since the implementation of mixed ownership reform, privatization of state-owned enterprises has been an important reform method. Currently, there are private enterprises that were initiated as state-owned enterprises during their IPO and later achieved control by natural persons or private enterprises through equity transfer. The existence of this conversion process may have a heterogeneous effect on the relationship between state-owned equity participation and ambidexterity innovation.

The results of grouping tests based on privatization methods are shown in Table 12. In the 2,564 samples of direct privatization, the sum of state-owned shareholders' holdings (STATE2) has a linear relationship with exploratory innovation investment and exploitative innovation investment, and both have significant positive effects. In the 668 samples of indirect privatization, the sum of state-owned equity holdings (STATE2) has a U-shaped relationship with exploratory innovation investment and a linear positive relationship with exploitative innovation investment, which is consistent with the previous conclusion. The above conclusions indicate that privatization methods have an impact on the relationship between the two. The impact is mainly reflected in direct privatization, where the linear positive effect of state-owned equity participation level on the exploratory innovation investment of private enterprises exists, and there is no stage where exploratory innovation investment decreases after the total sum of state-owned equity holdings reaches its peak value. Analysis shows that there is significant organizational inertia in directly privatized enterprises. In order to maintain short-term rapid economic growth, they are not willing to give up exploratory innovation investment easily, which is consistent with the current status of innovation investment in reality. This achieves a sustained positive

governance effect of continuous increase in ambidexterity innovation investment with the increase in the total sum of state-owned equity holdings.

Table 12. The results of direct/indirect privatization

Variable	Direct			Indirect	
	(1)	(2)	(3)	(4)	(5)
	DI	DI	EI	DI	EI
STATE2	1.6316** (2.0285)	0.8010** (2.2508)	2.5654*** (2.9162)	2.1811** (2.4086)	2.2320* (1.8005)
STATE2 <sup>2</sup>	-4.2992 (-0.8721)			-6.8408** (-2.2379)	
CONTROL	YES	YES	YES	YES	YES
INDUSTRY	YES	YES	YES	YES	YES
YEAR	YES	YES	YES	YES	YES
CONSTANT	-0.6616 (-1.4759)	-0.7169 (-1.6197)	4.7101*** (4.7514)	-1.6697*** (-2.8112)	-1.1932 (-0.4430)
N	2,564	2,564	2,564	668	668
R <sup>2</sup>	0.1433	0.1425	0.2818	0.1640	0.2596

## 6. Concluding Remarks and Managerial Implications

### 6.1 Concluding Remarks

State-owned capital participating in private enterprises in various ways is a concrete manifestation of mixed ownership reform and an important path for mixed ownership reform. However, as rational market players, the execution of private enterprises mainly depends on whether the expected benefits of participating in this reform exceed the opportunity cost. Therefore, can state-owned capital participation in private enterprises become an important way to improve "market rationality"? The implementation of mixed ownership reform in China has many practical implications, conforms to the basic national conditions of China's public ownership as the main body and the common development of various ownership economies, and is an effective way to optimize the capital layout of state-owned capital. The report of the 20th National Congress of the Communist Party of China pointed out that innovation-driven development is a major national strategy that needs to be adhered to in the long term. Enterprises are in a leading position in innovation and provide important support for the deepening implementation of the innovation-driven development strategy. This paper regards the injection of state-owned capital into private enterprises in China as an important source of innovation resources, and empirically tests the impact of state-owned capital participation in private enterprises on ambidexterity innovation investment of private enterprises based on theoretical analysis, in order to examine whether reverse mixed ownership reform can improve the "market rationality" of state-owned capital.

After using a series of matching and screening methods on data from private listed companies, this paper combined a series of theories such as ambidexterity innovation theory, resource dependence theory, financing hierarchy theory, and modern property rights theory to explore and found that the introduction of state-owned capital into private enterprises significantly promotes their exploratory and exploitative innovation investment. The level of state-owned equity holdings has a non-linear inverted U-shaped relationship with exploitative innovation investment and a linear positive correlation with exploratory innovation investment. This indicates that as the proportion of state-owned equity increases, there is a crowding-out effect on exploratory innovation investment. The above results have undergone a series of endogeneity tests and robustness tests, making the conclusions more reliable. Financing constraints were tested through channel mechanisms, and it was found that while financing constraints played a masking role, they also played a partial mediating role between state-owned equity participation and ambidexterity innovation investment. Agency costs were tested through moderating effects, and it was found that high and low agency costs have heterogeneous effects on state-owned equity participation and ambidexterity innovation investment, that is, agency costs play a negative moderating role between the two. Further heterogeneity tests on privatization methods found that their impact is mainly reflected in directly privatized enterprises, where the total sum of non-state-owned equity holdings has a linear positive relationship with ambidexterity innovation investment. Analysis shows that directly privatized enterprises have strong organizational inertia and will insist on exploitative innovation investment to maintain short-term economic performance growth.

## 6.2 Managerial Implications

The research in this article found certain insights for the selection of mixed ownership reform paths to amplify the efficiency of state-owned capital. Based on the research conclusions, the policy implications can be summarized in three aspects:

Firstly, this article affirms the positive role of introducing state-owned capital into private enterprises through empirical testing. Against the background of actively promoting mixed ownership reform, deep integration between state-owned capital and private capital should be promoted to fully leverage their respective advantages. By changing the direction of mixed ownership and increasing the intensity of reform, a unique equity structure with mutual restraint can be constructed through state-owned capital injection into private enterprises, creating a more development-friendly institutional environment and governance structure for private enterprises. The diversified equity structure can maintain the governance advantages of private enterprises while fully tapping into the resource advantages of state-owned equity ownership background. The institutional environment of private enterprises can be optimized based on the hidden resources of state-owned equity ownership background, making private enterprises more willing to take risks and not just focus on short-term profits at the expense of sustainable development. Ultimately, more innovation and research and development activities can be implemented to serve the country's industrial policies and promote industrial upgrading.

Secondly, the focus of mixed ownership reform can move towards injecting state-owned capital into private enterprises. Overall, the implementation of reverse mixed ownership reform can promote the increase of ambidexterity innovation investment in private enterprises to a certain extent. However, in privately-owned enterprises with controlling state-owned equity, there is a negative correlation between the proportion of state-owned shareholders and exploitative innovation investment, which is related to the preference of state-owned equity for exploratory innovation investment and subsequent crowding-out effect on exploitative innovation investment. In privately-owned enterprises with participating state-owned equity, non-state-owned shareholders have a dominant position in governance. They can fully leverage the governance model based on the separation of owners and operators and combine it with the resource effect brought by government endorsement of state-owned equity, which is conducive to significantly enhancing the innovation willingness of private enterprises. However, as the proportion of state-owned equity increases, exploratory innovation investment will crowd out exploitative innovation investment, which will have an adverse effect on maintaining short-term economic benefits and raise concerns about sustainable exploratory innovation investment. Therefore, not all industries and enterprises need to have state-owned capital in a controlling position. Maintaining a reasonable proportion of each capital's advantages and fully leveraging their respective economic resources is most conducive to the long-term sustainable development of private enterprises.

Thirdly, further attention should be paid to financing constraints in private enterprises. The governance structure with mutual restraint formed after state-owned equity participation can alleviate information asymmetry problems through more transparent and fair information disclosure mechanisms, reduce financing channel shortages and high financing costs caused by strong information asymmetry, and effectively ensure the sustainability of innovation investment. This provides evidence for the equity structure arrangement disputes in mixed ownership reform in private enterprises and has important policy implications for further deepening mixed ownership reform and promoting innovation through improving corporate governance.

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### References

- Bi, X. (2017). Government Subsidies, Financial Slack and Ambidextrous Innovation. *Accounting Research*, (01), 46-52.
- Block, J. H. (2012). R&D investments in family and founder firms: An agency perspective. *Journal of Business Venturing*, 27(2), 248-265. <http://doi.org/10.1016/j.jbusvent.2010.09.003>
- Chen, J., Qu, G., & Wang, L. (2019). New Theoretical Framework of Strategic Management. *Business and Management Journal*, 41(07), 5-19. <https://doi.org/10.19616/j.cnki.bmj.2019.07.001>
- Chen, W. (2017). Controlling Shareholders' Involvement and Equity Compensation: "Supervision" or "Collusion"? *Business and Management Journal*, 39(01), 114-133. <https://doi.org/10.19616/j.cnki.bmj.2017.01.008>
- Du, L., & Qian, X. (2021). Shadow Banking, Credit Channel and Effectiveness of Monetary Policy-Evidence from Microcosmic Entrusted Loans of Listed Companies. *China Industrial Economics*, (08), 152-170. <https://doi.org/10.19581/j.cnki.ciejournal.2021.08.008>
- Faccio, M., Masulis, R. W., & McConnell, J. J. (2006). Political connections and corporate bailouts. *The Journal of Finance*, 61(6), 2597-2635. <http://doi.org/10.1111/j.1540-6261.2006.01000.x>
- Fang, H., & Jin, Y. (2013). Corporate Governance, Internal Control and Inefficient Investment: Theoretical Analysis and Empirical Evidences. *Accounting Research*, (07), 63-69.
- Grossman, S. J., & Hart, O. D. (1986). The costs and benefits of ownership: A theory of vertical and lateral integration. *Journal of political economy*, 94(4), 691-719. <http://doi.org/10.1086/261404>
- Hadlock, C. J., & Pierce, J. R. (2010). New evidence on measuring financial constraints: Moving beyond the KZ index. *The review of financial studies*, 23(5), 1909-1940. <http://doi.org/10.1093/rfs/hhq009>
- Holmstrom, B. (1989). Agency costs and innovation. *Journal of Economic Behavior & Organization*, 12(3), 305-327. [http://doi.org/10.1016/0167-2681\(89\)90025-5](http://doi.org/10.1016/0167-2681(89)90025-5)
- Holmström, B. (1979). Moral hazard and observability. *The Bell Journal of Economics*, 74-91. <http://doi.org/10.2307/3003320>
- Jiang, C. (2011). A Way out for Traps of Independent Innovation in Chinese new ventures. *Journal of Management Sciences in China*, 14(04), 36-51.
- Jiang, F., Cai, W., Cai, X., & Li, X. (2019). Microeconomic Effects of Bank Competition: Evidence from Corporate Financial Constraints. *Economic Research Journal*, 54(06), 72-88.
- Ju, X., Dic, L., & Yu, Y. (2013). Financing Constraints, Working Capital Management and the Persistence of Firm Innovation. *Economic Research Journal*, 48(01), 4-16.
- Li, B., Xu, L., McIver, R. P., Liu, X., & Pan, A. L. (2022). Mixed-Ownership Reform and Private Firms' Corporate Social Responsibility Practices: Evidence from China. *Business & Society*, 61(2), 389-418. <https://doi.org/10.1177/0007650320958762>
- Li, H., & Shao, M. (2019). Private Capital's Participation, Policy Stability and the Effects of Mixed Ownership Reform. *China Economic Quarterly*, 18(04), 1329-1350. <https://doi.org/10.13821/j.cnki.ceq.2019.03.08>
- Li, Q., Wu, L., & Cai, G. (2022). Non-controlling State Ownership and Tax Burden in Private Firms. *Journal of Management Science*, 35(04), 99-111.

- Li, W., & Shao, Y. (2016). Industry Policy and Nationalization of Private Enterprises. *Journal of Financial Research*, (09), 177-192.
- Li, Z., Yun, F., Huang, J., & Lian, Y. (2021). Research on the Influence of State-Owned Capital's Shares on the Investment Efficiency of Non-State-Owned Enterprises. *Economist*, 267(03), 71-81. <https://doi.org/10.16158/j.cnki.51-1312/f.2021.03.008>
- Liu, H., Qi, Y., & Wang, C. (2017). On the Cost Stickiness Difference between Companies with Different Layers in Pyramida Business Group. *Accounting Research*, (07), 82-88.
- Liu, Y., Zhang, X., & Lan, X. (2016). The Influence of the Mixed Ownership Reform on the Total Factor Productivity of the State Owned Enterprises—An Empirical Study Based on PSM-DID Method. *Public Finance Research*, (10), 63-75. <https://doi.org/10.19477/j.cnki.11-1077/f.2016.10.007>
- Luo, H., & Qin, J. (2019). Research on the Influence of State-Owned Equity Participation on Family Firms' Innovation Investment. *China Industrial Economics*, 376(07), 174-192. <https://doi.org/10.19581/j.cnki.ciejournal.2019.07.010>
- Ma, L., Wang, L., & Zhang, Q. (2015). Pecking Order of Mixed Ownership: The Logic of Market. *China Industrial Economics*, 328(07), 5-20. <https://doi.org/10.19581/j.cnki.ciejournal.2015.07.001>
- Ma, X., Tang, T., & Zheng, G. (2021). Non-state Shareholders' Governance, Tax Avoidance and Tax Contribution in SOEs: Based on the Perspective of Mixed Ownership Reform. *Journal of Management World*, 37(06), <https://doi.org/10.19744/j.cnki.11-1235/f.2021.0082>
- Mihalache, O. R., Jansen, J. J. P., Van den Bosch, F. A. J., & Volberda, H. W. (2014). Top Management Team Shared Leadership and Organizational Ambidexterity: A Moderated Mediation Framework. *Strategic Entrepreneurship Journal*, 8(2), 128-148. <http://doi.org/10.1002/sej.1168>
- Peng, W. Q., Wei, K. J., & Yang, Z. (2011). Tunneling or propping: Evidence from connected transactions in China. *Journal of Corporate Finance*, 17(2), 306-325. <http://doi.org/10.1016/j.jcorpfin.2010.08.002>
- Ribau, C. P., Moreira, A. C., & Raposo, M. (2019). The role of exploitative and exploratory innovation in export performance: an analysis of plastics industry SMEs. *European Journal of International Management*, 13(2), 224-246. <http://doi.org/10.1504/EJIM.2019.098149>
- Shen, H., & Yang, M. (2019). Mixed Ownership Reform of State-owned Enterprises and Corporate Governance: A Case-Study on CHINA MERCHANTS GROUP. *Journal of Management World*, 35(04), 171-182. <https://doi.org/10.19744/j.cnki.11-1235/f.2019.0057>
- Song, Z., Feng, L., & Tan, X. (2014). State-ownership, Political Participation of Private Entrepreneurs and the Convenience of Enterprise Financing: An Empirical Research on China's Private-controlled Listed Companies. *Journal of Financial Research*, 414(12), 133-147.
- Wang, C., Li, S., & Huang, Z. (2022). Industrial Agglomeration, Technological Acquisition and Knowledge Spillover Effect. *Economic Theory and Business Management*, 42(10), 33-46.
- Wang, S., Feng, L., & Xu, Y. (2019). State-owned Equity, Party Organization and Corporate Governance on the Perspective of Mixed Ownership Reform. *Reform*, (07), 27-39.
- Wu, Q., Li, Z., & Yang, R. (2023). Dividend Intensity, Capital Mix Degree and the Preservation and Appreciation of Assets of State-owned Enterprises. *Business and Management Journal*, 45(02), 170-187. <https://doi.org/10.19616/j.cnki.bmj.2023.02.010>
- Wu, X., Liang, A., Li, F., & Jiang, X. (2018). System Credit Environment, Financial Constraints and Firm Innovation. *Inquiry into Economic Issues*, (12), 70-80.
- Xiang, D., & Yu, Y. (2020). Impact of Introducing Non-State-Owned Capital into State-Owned Enterprises—Empirical onnovation Performance—Evidence of State-Owned Listed Manufacturing Companies. *R&D Management*, 32(05), 152-165. <http://doi.org/10.13581/j.cnki.rdm.20190567>
- Yang, Y., Wei, J., & Luo, L. (2015). Who Innovate from the Government Subsidies? The Joint Moderate Effects of the Ownership and the Factor Market Distortions. *Journal of Management World*, (01), 75-86. <http://doi.org/10.14120/j.cnki.cn11-5057/f.2017.04.018>
- Yu, H., Yang, Z., & Song, Z. (2017). State Ownership, Political Connections, and Corporate Performance: A Research Based on Chinese Private-controlled Listed Firms Management Review.
- Yu, M., Zhong, H., & Fan, R. (2019). Privatization, Financial Constraints, and Corporate Innovation: Evidence

- from China's Industrial Enterprises. *Journal of Financial Research*, (04), 75-91.
- Yu, W., Wang, M., & Jin, X. (2012). The Rural-urban Inflation Convergence and Its Causes in China. *Economic Research Journal*, 47(09), 125-139.
- Zhao, X., & Yi, C. (2021). Can State-owned Capital Intervention Prohibit Real Enterprises Shifting from Real to Virtual Economy: On the Regulating Role of the Intimate and Clean Relationship between Politics and Business Relations. *Business and Management Journal*, 43(07), 61-74. <http://doi.org/10.19616/j.cnki.bmj.2021.07.004>
- Zhou, K., Ma, Z., & Wu, L. (2017). Managerial Academic Experience and Cost of Debt. *Economic Research Journal*, 52(07), 169-183.
- Zhu, L., Wu, F., & Li, X. (2021). Innovation Ability of Private Enterprises in China: Characteristic Facts and Influence Mechanism—From the Perspective of “Reverse Mixed Reform” Based on the Introduction of State-Owned Capital by Private Enterprises. *Finance & Economics*, 394(01), 76-90.

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